What is claimed is:

1. A noise attenuation system for speech coding comprising;

an encoder disposed to receive a digitized signal, the encoder to provide a bitstream based upon a speech coding of the digitized signal;

where the speech coding determines at least one gain scaling a portion of the digitized signal; and

where the encoder adjusts the at least one gain as a function of noise characteristic.

2. The noise attenuation system according to Claim 1, where the speech coding comprises code excited linear prediction (CELP).

3. The noise attenuation system according to Claim 1, where the speech coding comprises extended code excited linear prediction (eX-CELP).

4. The noise attenuation system according to Claim 1, where the at least one gain is adjusted prior to quantization by the speech coding.

5. The noise attenuation system according to Claim 1, where the encoder adjusts the at least one gain according to a gain factor.

6. The noise attenuation system according to Claim 5, where the gain factor Gf is determined by the equation,

$$Gf = 1 - C \cdot NSR$$

where NSR has a value of about 1 when the portion comprises essentially background noise, where NSR is the square root of background noise energy divided by signal energy when the portion comprises speech, and where C is in the range of 0 through 1.

7. The noise attenuation system according to Claim 6, where C is in the range of about 0.4 through about 0.6.

8. The noise attenuation system according to Claim 6, further comprising a voice activity detector (VAD) operatively connected to the encoder, the VAD to determine when the portion comprises speech.

9. The noise attenuation system according to Claim 5, where the gain factor is based on a running mean.

10. The noise attenuation system according to Claim 9, where the running mean Gf_{new} is determined by the equation,

$$Gf_{new} = \alpha \cdot Gf_{old} + (1 - \alpha) \cdot Gf_{current}$$

where Gf_{old} is a preceding gain factor for a preceding portion of the digitized signal, where $Gf_{current}$ is the gain factor based on the portion of the digitized signal, and where $0 \leq \alpha < 1$.

11. The noise attenuation system according to Claim 10, where α is equal to about 0.5.

12. The noise attenuation system according to Claim 1, where the portion of the digitized signal is one of a frame, a sub-frame, and a half frame.

13. The noise attenuation system according to Claim 1, where the encoder comprises a digital signal processing (DSP) chip.

14. The noise attenuation system according to Claim 13, further comprising a preprocessor operatively connected to receive the digitized signal from the analog-to-digital converter, the preprocessor to modify spectral magnitudes of the digitized signal to reduce noise, the preprocessor to provide a noise-suppressed digitized signal to the encoder.

15. The noise attenuation system according to Claim 1, further comprising a decoder operatively connected to receive the bitstream from the encoder, the decoder to provide a reconstructed signal based upon the bitstream.

16. A noise attenuation system for speech coding comprising;

a decoder disposed to receive a bitstream, the decoder to provide a reconstructed signal based upon a speech decoding of the bitstream;

where the speech decoding determines at least one gain scaling a portion of the reconstructed signal; and

where the encoder adjusts the at least one gain as a function of noise characteristic.

17. The noise attenuation system according to Claim 16, where the speech decoding comprises code excited linear prediction (CELP).

18. The noise attenuation system according to Claim 16, where the speech decoding comprises extended code excited linear prediction (eX-CELP).

19. The noise attenuation system according to Claim 16, where the at least one gain is adjusted after decoding by the speech decoding.

20. The noise attenuation system according to Claim 16, where the decoder adjusts the at least one gain according to a gain factor.

21. The noise attenuation system according to Claim 20, where the gain factor Gf is determined by the equation,

$$Gf = 1 - C \cdot NSR$$

where NSR has a value of about 1 when the portion comprises essentially background noise, where NSR is the square root of background noise energy divided by signal energy when the portion comprises speech, and where C is in the range of 0 through 1.

22. The noise attenuation system according to Claim 21, where C is in the range of about 0.4 through about 0.6.

23. The noise attenuation system according to Claim 21, further comprising a voice activity detector (VAD) operatively connected to the decoder, the VAD to determine when the portion comprises speech.

24. The noise attenuation system according to Claim 20, where the gain factor is based on a running mean.

25. The noise attenuation system according to Claim 24, where the running mean Gf_{new} is determined by the equation,

$$Gf_{new} = \alpha \cdot Gf_{old} + (1 - \alpha) \cdot Gf_{current}$$

where Gf_{old} is a preceding gain factor for a preceding portion of the reconstructed signal, where $Gf_{current}$ is the gain factor based on the portion of the reconstructed signal, and where $0 \leq \alpha < 1$.

26. The noise attenuation system according to Claim 25, where α is equal to about 0.5.

27. The noise attenuation system according to Claim 16, where the portion of the reconstructed signal is one of a frame, a sub-frame, and a half frame.

28. The noise attenuation system according to Claim 16, where the decoder comprises a digital signal processing (DSP) chip.

29. The noise attenuation system according to Claim 16, further comprising an encoder operatively connected to provide the bitstream to the decoder.

30. A noise attenuation system for speech coding comprising:

an encoder disposed to receive a digitized signal, the encoder to provide a bitstream based upon a speech coding of the digitized signal, where the speech coding determines at least one gain scaling a portion of the digitized signal, and where the encoder adjusts the at least one gain as a function of noise characteristic; and

a decoder operatively connected to receive the bitstream from the encoder, where the decoder provides a reconstructed signal based upon a speech decoding of the bitstream, where the speech decoding reconstructs the at least one

gain scaling the portion of the digitized signal, and where the decoder adjusts the at least one gain as a function of noise characteristic.

31. The noise attenuation system according to Claim 30, where the speech coding and the speech decoding comprise code excited linear prediction (CELP).

32. The noise attenuation system according to Claim 30, where the speech coding and the speech decoding comprise extended code excited linear prediction (eX-CELP).

33. The noise attenuation system according to Claim 30, where at least one of the encoder and the decoder adjusts the at least one gain.

34. The noise attenuation system according to Claim 30, where at least one of the encoder and the decoder adjusts the gain according to a gain factor.

35. The noise attenuation system according to Claim 34, where the gain factor Gf is determined by the equation,

$$Gf = 1 - C \cdot NSR$$

where NSR has a value of about 1 when the portion comprises essentially background noise, where NSR is the square root of background noise energy divided by signal energy when the portion comprises speech, and where C is in the range of 0 through 1.

36. The noise attenuation system according to Claim 35, where C is in the range of about 0.4 through about 0.6 when one of the encoder and the decoder adjusts the gain by the gain factor.

37. The noise attenuation system according to Claim 35, where C is in the range of about 0.2 through about 0.4 when the encoder and the decoder adjust the gain by the gain factor.

38. The noise attenuation system according to Claim 35, further comprising a voice activity detector (VAD) operatively connected at least one of the encoder and the decoder, the VAD to determine when the portion comprises speech.

39. The noise attenuation system according to Claim 34, where the gain factor is based on a running mean.

40. The noise attenuation system according to Claim 39, where the running mean Gf_{new} is determined by the equation,

$$Gf_{new} = \alpha \cdot Gf_{old} + (1 - \alpha) \cdot Gf_{current}$$

where Gf_{old} is a preceding gain factor for a preceding portion of the digitized signal, where $Gf_{current}$ is the gain factor based on the portion of the digitized signal, and where $0 \leq \alpha < 0$.

41. The noise attenuation system according to Claim 40, where α is equal to about 0.5.

42. The noise attenuation system according to Claim 30, where the portion of the digitized signal is one of a frame, a sub-frame, and a half frame.

43. The noise attenuation system according to Claim 30, further comprising:

an analog-to-digital converter disposed to receive and convert an analog signal into the digitized signal; and

a preprocessor operatively connected to provide the digitized signal from the analog-to-digital converter to the encoder, the preprocessor to modify spectral magnitudes of the digitized signal to reduce noise.

44. The noise attenuation system according to Claim 30, where at least one of the encoder and the decoder comprises a digital signal processing (DSP) chip.

45. A method of attenuating noise in a speech coding system, comprising:

(a) segmenting a digitized signal into at least one portion;

(b) determining at least one gain scaling the digitized signal within the one portion;

(c) adjusting the at least one gain as a function of noise characteristic; and

(d) quantizing the at least one gain into a group of at least one bit for a bitstream.

46. The method of attenuating noise according to Claim 45, where the speech coding system comprises code excited linear prediction (CELP).

47. The method of attenuating noise according to Claim 45, where the speech coding system comprises extended code excited linear prediction (eX-CELP).

48. The method of attenuating noise according to Claim 45, where step (a) further comprises:

sampling an analog signal to produce the digitized signal; and

modifying the spectral magnitudes of the digitized signal to reduce noise.

49. The method of attenuating noise according to Claim 45, where step (c) further comprises adjusting the at least one gain according to a gain factor.

50. The method of attenuating noise according to Claim 49, where the gain factor Gf is determined by the equation

$$Gf = 1 - C \cdot NSR$$

where NSR has a value of about 1 when the portion comprises essentially background noise, where NSR is the square root of background noise energy divided by signal energy when the portion comprises speech, and where C is in the range of 0 through 1.

51. The method of attenuating noise according to Claim 49, where the gain factor is based on a running mean.

52. The method of attenuating noise according to Claim 51, where the running mean Gf_{new} is determined by the equation,

$$Gf_{new} = \alpha \cdot Gf_{old} + (1 - \alpha) \cdot Gf_{current}$$

where Gf_{old} is a preceding gain factor for a preceding portion of the digitized signal, where $Gf_{current}$ is the gain factor based on the portion of the digitized signal, and where $0 \leq \alpha < 1$.

53. The method of attenuating noise according to Claim 52, where α is equal to about 0.5.

54. The method of attenuating noise according to Claim 45, where the portion is one of a frame, a sub-frame, and a half frame.

55. A method of attenuating noise in a speech coding system, comprising:

(a) decoding at least one gain from a group of at least one bit in a bitstream;

(b) adjusting the at least one gain as a function of noise characteristic; and

(c) assembling the at least one gain into a portion of a reconstructed speech signal.

56. The method of attenuating noise according to Claim 55, where the speech coding system comprises code excited linear prediction (CELP).

57. The method of attenuating noise according to Claim 55, where the speech coding system comprises extended code excited linear prediction (eX-CELP).

58. The method of attenuating noise according to Claim 55, where step (b) further comprises adjusting the at least one gain according to a gain factor.

59. The method of attenuating noise according to Claim 58, where the gain factor Gf is determined by the equation

$$Gf = 1 - C \cdot NSR$$

where NSR has a value of about 1 when the portion comprises essentially background noise, where NSR is the square root of background noise energy divided by signal energy when the portion comprises speech, and where C is in the range of 0 through 1.

60. The method of attenuating noise according to Claim 58, where the gain factor is based on a running mean.

61. The method of attenuating noise according to Claim 60, where the running mean Gf_{new} is determined by the equation,

$$Gf_{new} = \alpha \cdot Gf_{old} + (1 - \alpha) \cdot Gf_{current}$$

where Gf_{old} is a preceding gain factor for a preceding portion of the digitized signal, where $Gf_{current}$ is the gain factor based on the portion of the digitized signal, and where $0 \leq \alpha < 1$.

62. The method of attenuating noise according to Claim 61, where α is equal to about 0.5.

63. A method of attenuating noise in a speech coding system, comprising:

(a) segmenting a digitized signal into at least one portion;

(b) determining at least one gain representing the digitized signal within the one portion;

(c) pre-adjusting the at least one gain as a function of noise characteristic;

(d) quantizing the at least one gain into a group of at least one bit for a bitstream.

(e) decoding the at least one gain from the group of at least one bit in the bitstream;

(f) post-adjusting the at least one gain as a function of noise characteristic; and

(g) assembling the at least one gain into a reconstructed speech signal.

64. The method of attenuating noise according to Claim 63, where the speech coding system comprises code excited linear prediction (CELP).

65. The method of attenuating noise according to Claim 63, where the speech coding system comprises extended code excited linear prediction (eX-CELP).

66. The method of attenuating noise according to Claim 63, where at least one (c) and (f) further comprises adjusting the at least one gain according to a gain factor.

67. The method of attenuating noise according to Claim 66, where the gain factor Gf is determined by the equation

$$Gf = 1 - C \cdot NSR$$

where NSR has a value of about 1 when the portion comprises essentially background noise, where NSR is the square root of background noise energy divided by signal energy when the portion comprises speech, and where C is in the range of 0 through 1.

68. The method of attenuating noise according to Claim 66, where the gain factor is based on a running mean.

69. The method of attenuating noise according to Claim 68, where the running mean Gf_{new} is determined by the equation,

$$Gf_{new} = \alpha \cdot Gf_{old} + (1 - \alpha) \cdot Gf_{current}$$

where Gf_{old} is a preceding gain factor for a preceding portion of the digitized signal, where $Gf_{current}$ is the gain factor based on the portion of the digitized signal, and where $0 \leq \alpha < 0$.

70. The method of attenuating noise according to Claim 69, where α is equal to about 0.5.